

ENERGY INFORMATION AT POINT OF SALE: AN OVERVIEW

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## INTRODUCTION

Approximately one-fifth of North American energy is consumed in the home[1]. The five applications that account for the majority of in-home consumption are home heating (53%), water heating (14%), food cooling/freezing (9%), home cooling (7%) and cooking (5%). One possible way to achieve energy conservation in this area is to provide consumers with information that will enable them to purchase the brands/models that are more energy efficient. For example, one refrigerator may use as much as 30 percent more energy than a similar model. The potential of this approach has led policy makers in both Canada and the United States to concern themselves with point of sale energy labeling for consumer durables. The same concern provides the focus for this paper.

This discussion of energy information at point of sale (EIPS) is divided into four parts. First, a conceptual structure is provided to put energy conservation and point of sale information into perspective. Second, the literature is reviewed with the intention of assessing evidence to date regarding the potential impact of EIPS. Third, current EIPS activities of both retailers and governments are reviewed. Finally, one ongoing consumer research study designed to evaluate the impact of EIPS disclosures is discussed in the last section.

## ENERGY CONSERVATION AND POINT OF SALE INFORMATION

A conceptual structure for viewing the EIPS area can be provided by considering, first, the alternative strategies for increasing consumer energy conservation and, second, the potential messages and media available to communicate energy information.

### Strategies for Increasing Consumer Energy Conservation

EIPS is only one of several alternative strategies for achieving consumer energy savings. Table 1 presents a general classification scheme for conservation strategies. As indicated in this table, consumer energy conservation can be achieved through a variety of regulatory or informational programs which encourage: (1) design of more efficient products, (2) consumer purchase of more energy efficient brands/models, or (3) reduced or more efficient usage of energy consuming products.

TABLE 1

STRATEGIES FOR CONSUMER ENERGY CONSERVATION:  
STRUCTURE & EXAMPLES

| GENERAL<br>STRATEGY<br>TYPES | LOCUS OF IMPACT                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                      |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | Product<br>Design                                                                                                                 | Consumer Purchase<br>Choice                                                                                                                                                                                                                                                                                                                                                                            | Consumer Use<br>Behavior                                                                                                                                                             |
| Regulation<br>(Mandatory)    | <ul style="list-style-type: none"> <li>minimum standards (kmpg)</li> <li>product bans</li> </ul>                                  | <ul style="list-style-type: none"> <li>tax on energy inefficient products (big cars)</li> </ul>                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>energy taxes (gasoline or utilities)</li> <li>speed limits</li> </ul>                                                                         |
| Information<br>(Voluntary)   | <ul style="list-style-type: none"> <li>advice to manufacturers re: conservation through changes in materials or design</li> </ul> | <ul style="list-style-type: none"> <li>advertising campaigns on what to buy to conserve energy (insulate home)</li> </ul> <div data-bbox="743 1050 1035 1305" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <ul style="list-style-type: none"> <li>point of sale labels on product energy consumption</li> <li>salesperson's advice re: energy conserving models</li> </ul> </div> | <ul style="list-style-type: none"> <li>advertising campaigns on how to conserve (turn down thermostats)</li> <li>consumption feedback to sensitize consumer to energy use</li> </ul> |
|                              |                                                                                                                                   | EIPS                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                      |

\* Box indicates focus of this paper.

Although this paper does not focus on alterations in product design or consumer use behavior, it is important to note that these are areas of substantial potential energy savings. For example, individual design options can produce energy efficiency improvements of anywhere from 3 - 33% for refrigerators and freezers, 3 - 25% for ranges, 2 - 50% for clothes washers, 2 - 20% for clothes dryers, 4 - 30% for dishwashers and 2 - 10% for room air conditioners<sup>1</sup>. At the same time, discrete use of these appliances (e.g. by reducing operating time, changing temperature settings, etc.) will cut energy consumption.

The focus of this paper is on strategies for changing consumer purchase/choice. Although it may not be generally known, substantial consumer energy saving is possible through wise purchase behavior. For example, Consumer Reports indicates "there are refrigerator-freezers that do a good job on 25 to 30 percent less electricity than comparable models [2]" Also, evidence exists to suggest that there is similar variation in the energy consumption of household air conditioners with the same cooling capacity [3]. Thus, the issue becomes one of providing consumers with adequate information so that the energy-efficient choices can be made. The next section provides a structure for considering alternative approaches for energy information provision.

#### Energy Information for Consumer Purchase Choice

Information programs are a primary means of encouraging consumers to make energy efficient choices. Table 2 classifies alternate means by which consumers receive information.

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<sup>1</sup> These figures are contained in a series of technical background papers on U.S. appliance efficiency targets released by the Federal Energy Administration in 1976.

TABLE 2

CONSUMER ENERGY INFORMATION  
STRUCTURE & EXAMPLES

| MEDIA                                                                         | MESSAGE TYPE                                                                                                                                                                                   |                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                               | Non-Commercial                                                                                                                                                                                 | Commercial                                                                                                                                                                                                                                                         |
| Mass Media<br>(TV, Radio,<br>Newspaper,<br>Magazines)                         | <ul style="list-style-type: none"> <li>public agency ads re: energy consumption differences across brands/models</li> <li><u>Consumer Reports</u> comparing brands/models</li> </ul>           | <ul style="list-style-type: none"> <li>manufacturers' ads featuring energy saving brand advantages</li> </ul>                                                                                                                                                      |
| Point of Sale<br>(displays,<br>booklets, sales<br>presentation,<br>labels)    | <ul style="list-style-type: none"> <li>booklets by public agency available for use by retailer</li> <li>standardized energy labels</li> </ul>                                                  | <ul style="list-style-type: none"> <li>manufacturers' booklets featuring energy saving advantages</li> <li>retailer's display featuring energy saving models</li> <li>model naming ("Energy Saver")</li> <li>sales presentation featuring energy saving</li> </ul> |
| Word-of-Mouth<br>(friends/<br>family,<br>consumer<br>information<br>services) | <ul style="list-style-type: none"> <li>discussions with experienced friends or family</li> <li>telephone/visit consumer information service operated by public or non-profit agency</li> </ul> |                                                                                                                                                                                                                                                                    |

As indicated in this table, consumer energy information can be communicated via various media--mass advertising, point of sale and word-of-mouth. Further, the communication may be commercially sponsored, by manufacturers and retailers, or may be non-commercially sponsored, by government or non-profit agencies. There are also many message content variations. The examples in Figure 2 are chosen to emphasize the energy consumption attributes of products for it is this type of information which is likely to have a direct effect on purchase decisions, particularly when it is available and is emphasized at the point of sale. Other general energy related messages (the nature of the energy problem and energy prices, for example), are listed in the Appendix.

Table 2 provides a useful framework for considering the potential impact of government sponsored (non-commercial) energy information labels, such as are being developed in Canada and the United States. There appear to be a number of issues about which policy makers should be concerned. One key question is, to what extent these vehicles will influence choice by themselves and in conjunction with supportive point of sale and/or mass media communications. Related concerns are what message content to include on the labels (e.g., units of consumption, cost of consumption) and, what format of presentation to use (e.g., figures, charts/indices). The overriding concern, of course, is whether the content is salient to consumers. It is well known that information about product attributes which consumers perceive to be unimportant will not determine their choice behavior, and there is reason to believe that to date consumers do not use energy-related criteria when purchasing major energy consuming durables.

#### POTENTIAL IMPACT OF E.I.P.S.: A REVIEW

Though direct evidence on energy label impact is limited, a considerable body of research exists which can be used to assess the potential impact such point of sale energy disclosures might have. This research covers three topic areas: (1) the salience of energy attributes to consumers, (2) the impact of other labeling schemes, and (3) the importance of salespeople in durable good purchase decisions. These three areas of literature will be reviewed in turn.

### Consumer Concern for Energy Attributes

Consumers are concerned about energy conservation. In Canada and the United States, recent studies show that 64% [4] and 84% [5], respectively, judge energy problems to be "very" or "somewhat" serious. However, this concern is only weakly reflected in their purchase decisions. That is, little importance is attached to energy-related product attributes in consumer purchases of major energy consuming durables.

In a 1977 study involving consumers who had recently purchased refrigerators or freezers, not a single respondent mentioned energy related choice criteria in response to an open-ended question on reasons for choosing the particular appliance item [6]. In addition, when asked to rate the importance of a list of product attributes to their purchase on a six point rating scale, respondents attached the lowest importance to operating costs and energy efficiency attributes. This study led to the following three conclusions:

- (1) energy related attributes are not determinant in appliance choice behavior;
- (2) consumers are likely to be unwilling to tradeoff operating (energy) cost savings for convenient appliance features such as frost-free operation; and
- (3) energy information labels may not have significant effects on appliance choice behavior.

Further evidence on the lack of salience of energy attributes is contained in a study by Denham et al [7]. The study was conducted in early 1977 and involved personal interviews with over 1,600 Canadian households. Part of the information collected was about the purchase of appliances. The study indicated that energy operating cost did not appear among the three most important purchase criteria for any appliance included in the study. These results clearly illustrate the fact that although consumers may be concerned about energy issues, they do not at present consider energy attributes to be salient purchase criteria in their appliance purchase decisions.

The situation is a little more encouraging for automobiles, a major energy consuming product. In a 1976 U.S. study designed to evaluate the impact of a gas mileage labeling program (window stickers on new cars at point of sale), results indicated that a modest share of new car buyers took the opportunity to compare vehicles for fuel economy [8]. This study

also found that only 56 percent of new car purchasers in 1976 reported good fuel economy as an "extremely important" variable in their purchase decisions. Further, only about half of new car buyers (53%) reported actually noticing the gas mileage label on the vehicle they bought. When asked in an open-ended question to give their reasons for deciding on a particular make/model, only one out of five new car buyers (21%) in 1976 mentioned fuel economy. The researchers concluded that the public has not yet adopted energy conservation as a primary factor in consumption decisions, at least in the case of automobiles.

As discussed by Denney [9], the problem may be attributable to the fact that consumers do not feel energy issues rank among the highest priorities for public concern; they appear willing to make some effort but are not prepared to take decisive actions such as exerting the kind of shopping effort required to ensure that the most energy efficient product alternative is chosen.

The implications of this apparent lack of salience of energy information for EIPS are that it is not enough to simply make energy information available to consumers. Efforts must to be made to show/convince consumers of its relevance --a much more demanding task.

#### Impact of Other Point of Sale Information Programs

A recent summary of the impact of a variety of point of purchase consumer information schemes is presented in Table 3. The observed effects of five different disclosure requirements (nutrition labeling, unit pricing, truth in lending, information tags/labels and open dating) were arranged in a hierarchy of possible responses, information acquisition, information processing, and information use. The most noteworthy aspect of this table is the apparent support for the hierarchy conception across all five schemes. Consistently, indicators of information acquisition ranked higher than indicators of information processing, and where behavioral (use) measures were employed, they ranked lowest of the three.

With nutritional labeling, for example, 26% of the consumers were exposed to the label, 16% understood the label, and only 9% claimed use of the information. A similar pattern emerged for unit pricing - 60 to 70 percent were aware of the concept, 50% understood its meaning, and 30 to 50 percent claimed to use it in a buying decision. For informative labels (buying guide tags), 50% noticed the tags, 28% found them helpful, but there was no measurable behavioral effect. The findings presented for truth in lending and open dating disclosure schemes also supported the hierarchy of effects concept.

TABLE 3  
EVIDENCE OF EFFECTS OF SELECTED INFORMATION DISCLOSURE REQUIREMENTS  
(Unless noted, proportions refer to entire sample.)

| Effect                                            | Disclosure Requirement       |                                                                                |                                                                                                                        |                                                              |                                                               |
|---------------------------------------------------|------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------|
|                                                   | Nutrition Labeling           | Unit Pricing                                                                   | Truth in Lending                                                                                                       | Buying Guide Tags (Small Appliances)                         | Open Dating                                                   |
| 1. Awareness of information                       | 26% saw label                | 60% to 70% awareness of concept                                                | 57% of all credit buyers noticed some credit information                                                               |                                                              | 65% noticed                                                   |
| 2. Comprehension of information                   | 16% understood label         | 50% understood meaning of concept                                              | 34% correctly reported interest rate on a recent purchase                                                              |                                                              | 36% knew that the pull date was used                          |
| 3. Confidence in judgements                       | N/A                          |                                                                                | 34% felt better knowing rates and charges                                                                              |                                                              | N/A                                                           |
| 4. Satisfaction                                   |                              |                                                                                |                                                                                                                        |                                                              | Higher degree of satisfaction with freshness                  |
| 5. Claimed use of information (one or more times) | 9% used labels at least once | 30% to 50% used in a buying decision                                           | 10% of all credit buyers used in last durable purchase                                                                 | 80% found tag helpful                                        | 39% used open dating on one or more products during last trip |
| 6. Impact on behavior (a) self-report             |                              | 5% to 30% of claimed users said some element of a shopping trip was influenced |                                                                                                                        |                                                              | 50% reduction in report of spoiled food                       |
| (b) other evidence                                |                              |                                                                                | Realizable relationship of knowledge and shopping behavior, choice of credit source, or decision to use credit or cash | No evidence of effect on pattern of sales of specific models |                                                               |

SOURCE: George S. Day, "Assessing the Effects of Information Disclosure Requirements," Journal of Marketing, 40, (April 1976): p. 46, Table 2.

Similar findings were also reported by Anderson [10] for an informative labeling scheme for household carpeting. Labels varying in amounts and types of performance information were presented to consumers in a simulated carpet shopping situation. The labels were found to have some attitudinal effects (consumers felt better) but negligible behavioral impact (consumers chose better or differently).

Findings from an experimental study by Hutton [11] suggested that the impact of life cycle cost (LCC) labels on consumers was strongest for measures reflecting more cognitive as opposed to behavioral aspects of decision making. Hutton concluded that the consumers' knowledge of energy cost data was lacking and that they did not consider energy to be an important dimension of choice. LCC information had virtually no impact on choice behavior in that consumers were not willing to give up the energy consuming convenience features.

#### Impact of Salespersons on Purchase Choice

The impact of public energy disclosure requirements such as energy performance labels and booklets is likely to be mediated by salespersons' influences on consumer decision making. The reason for this is that salespeople appear to be the dominant source of information to durable product buyers [10]. Not only are they the most frequently consulted of all information sources, but buyers who do rely on salespeople appear to end up being more satisfied with their purchase than those who rely on some other source [10]. In the specific case of appliance purchases Olshavsky [12] presents findings that suggest it is the salesperson who determines the product attributes considered by consumers. This dominant source, therefore, is very likely to outweigh the impact of energy labels or booklets at the point of sale. If salespeople decide to emphasize the energy attributes of their products and use the label or booklet information in their sales presentations it is likely that the consumer purchase decision would incorporate energy related criteria. However, if the salesperson does not emphasize energy attributes, the mere existence of the energy labels/booklets at the point of sale is likely to have minimal impact on consumer purchase decisions. The research project outlined in the final section of this paper is designed to shed light on the importance of supportive roles by salespeople and other media in ensuring the success of energy labeling schemes of the type under development in Canada and the United States.

## CURRENT E.I.P.S. ACTIVITIES

Two areas of EIPS activities are reviewed here. The first is a discussion of in-store retail activities. This is followed by a review of recent government activities in the area of energy labeling.

### In-Store Energy Information

When one is reviewing the current state of point of sale information on energy consumption, two questions need to be considered.

- (1) Are some appliance brands/models really more energy-efficient than others?
- (2) To what extent is information regarding brand/model energy consumption differences available from in-store sources?

Preliminary assessment of these two questions was done by selecting two major household energy consuming appliances: refrigerators and stoves. Both appliances account for a significant amount of household energy consumption and are readily purchased by consumers as first purchases or as replacement purchases. Standard wattage consumption figures as well as operations costs for these appliances are available from electric utility companies (Table 4). Table 4 clearly indicates differences among models- for example, self-clean vs. conventional range, frost-free vs. manual defrost refrigerator. Consumer Reports also found that there is as much as 30 percent variation in the amount of electricity consumed among comparable models of refrigerators [2]. Therefore, the answer to the first question is clearly, yes, some brands and models are more energy efficient than others.

In order to answer the second question as to what extent this information is currently available at point of purchase, a limited survey of appliance retail stores was carried out in Vancouver. Four types of retail appliance outlets were studied regarding EIPS (small appliance stores, major furniture/appliance stores, major downtown department stores, small department stores). In all cases a young woman entered the store and informed the salesman she was interested in purchasing a new range and refrigerator for a home which was to be remodelled during the summer. She said she was just starting to look for the appliances and had no previous experience in purchasing such items. Energy information available from displays, labels, salesmen and take home literature was noted. If the

TABLE 4

AVERAGE ENERGY CONSUMPTION FOR SELECTED APPLIANCES

| APPLIANCE                        | ENERGY CONSUMPTION |                          |
|----------------------------------|--------------------|--------------------------|
|                                  | kWh per year       | Cost per year (3.8¢/kWh) |
| refrig 12 cu ft (manual defrost) | 728                | \$27.50                  |
| refrig 12 cu ft (frostless)      | 1,217              | \$46.18                  |
| refrig 14 cu ft (manual defrost) | 1,137              | \$43.14                  |
| refrig 14 cu ft (frostless)      | 1,829              | \$69.58                  |
| range/oven                       | 1,200              | \$45.60                  |
| range/oven self-cleaning         | 1,320              | \$50.16                  |

Source: British Columbia Power and Hydro Authority.

salesman did not mention energy aspects in his sales presentation, he was then asked how economical the appliances were to operate, and whether there were energy consumption differences among brands or similar models.

Twelve stores were surveyed, including:

- 2 specialty stores,
- 2 major appliance stores,
- 5 major downtown department stores, and
- 3 small type department stores,

giving a good cross section of available appliance shopping situations. The results of this survey were as follows:

- (i) Displays and Product Labels. No product labels were found which gave information on energy consumption across all product brands and models. Two major department stores had displays about therma-wall thin insulation and one added a display about an energy saver switch. One salesman used the thin-wall construction as a selling point for increased storage space. In the other store the salesman said he knew nothing special about the "thin-wall" construction (quote, "They're all like that now"), and said he thought the energy saver switch was a waste of time. He said he "couldn't imagine running to the fridge and flipping a switch every time it rains."
- (ii) Energy Information VOLUNTEERED by Salesmen. Two downtown department store salesmen pointed out energy efficiency aspects of self-cleaning ovens due to increased insulation and therefore less heat loss during use. They also pointed out the cost of oven cleaner and gloves would be done away with so the actual cost of operating a self-cleaning oven could be less than a conventional one. This information was used as a selling point in their presentation. No other salesmen volunteered any other energy related information.
- (iii) Salesmen's Response to Energy Questions ("How economical are these appliances to operate?" and "Are there differences among models or brands as to their electrical consumption?").

Salesman, Specialty Store 1:

"... manual defrost takes less energy ... conventional oven takes less energy... conventional oven is a far better deal... self-cleaning not perfected yet."

Salesman, Specialty Store 2:

"... phone B.C. Hydro for all energy consumption information."

Salesman, Major Furniture/Appliance Store 1:

"... approximate operating costs of appliances are... brands vary by 30 percent in energy use due to insulation and amps... consult Consumer Reports at Public Library."

Salesman, Major Furniture/Appliance Store 2:

"... frost-free refrigerators and self-cleaning ovens cost more to operate but there is no difference among brands on energy use."

Salesman, Downtown Department Store 1:

"... self-cleaning ovens are more efficient than conventional ranges... frost-free refrigerators are just as energy efficient as manual ones because you never have to turn off to defrost... manual defrost consumed just as much energy due to starting motor up again after cleaning." This salesman offered a photocopy of a newspaper article giving cost of energy by appliance (which contradicted his sales presentation).

Salesman, Downtown Department Store 2:

"... here are charts from B.C. Hydro which give yearly figures for energy consumption of different appliances."

Salesman, Downtown Department Store 3:

"... phone B.C. Hydro for energy consumption information... frost-free refrigerators would be cheaper to run due to better storage of food, no freezer burn and therefore less waste... there are no differences in energy consumption among brands of similar appliances."

Of the twelve salesmen "interviewed", only one knew that there is up to 30 percent variation in the energy consumption among brands of a similar model. Energy aspects were mentioned by two salesmen to point out that the self-cleaning and conventional ovens were comparable to operate due to extra insulation in the self-cleaning. Four salesmen instructed the consumer to contact the Hydro Authority for information on energy consumption of appliances. Two salesmen offered incorrect information on energy use of manual vs. frost-free refrigerators. Most salesmen were vague on their interpretation of the energy consumption of the self-cleaning oven. The majority of the sales presentations focused on physical features of the appliances such as butter conditioner, ice maker and cantilever shelves in refrigerators, and elements, digital clocks and rotisseries in ranges.

- (iv) Take Home Literature. Take home literature was readily available from eight of the twelve retail outlets. Pamphlets representing ten different brands were collected and checked for mention of energy consumption aspects. Only one manufacturer's brochures mentioned energy saving features, and even here no indication of

the magnitude of the saving was provided. The main thrust of the brochures was styling and features.

In summary, the facts about energy consumption of appliances indicate potential for saving energy. However, consumer choices of appliances rely heavily on in-store information, especially on the sales presentation. Thus, if energy consumption is to enter into the decision-making process the consumer must have the energy information brought to his attention in the store. From the limited survey of Vancouver appliance dealers it appears energy information is usually unavailable to the consumer, whether through labels, displays, sales presentations or take home literature. In addition, if the consumer happens to inquire about energy consumption of the appliances the resulting information from the salesman is frequently inaccurate.

#### E.I.P.S. Activities by Governments

There is a strong public policy thrust, both in Canada and the United States, towards improving the energy information environment at point of sale. The major media vehicles to be employed are energy performance labels attached to products at point of sale. However, supportive media such as performance data booklets and mass media education programming are also being considered.

This review begins with a discussion of a few key examples of energy labels. Though the discussion is restricted to appliance energy labels, it is recognized that similar points could be made for other major energy consuming durables, particularly automobiles, where energy labeling programs exist or are being contemplated. Also it is recognized that many other media such as those listed in Table 2 could be employed to communicate energy-relevant messages.

Canada's ENERGUIDE Label for Appliances. The Canadian Standards Association (CSA) has instituted a voluntary program for measuring the performance of electrical products, including energy efficiency, and communicating the information to consumers. Working in cooperation with government, industry and consumer groups, the CSA has recently published a standard test procedure for measuring the amount of electrical energy household refrigerators use (CSA Standard C300-1978) and is in the process of drafting similar standards for freezers, ranges, clothes washers, clothes dryers and dishwashers [13]. Appliance manufacturers are now in the

process of testing the energy consumption of their models and will forward the information to CSA which, in turn, will conduct verifying tests. Canadian appliance manufacturers have agreed to include the verified energy consumption information on CSA sponsored ENERGUIDE labels attached to the appliance. These labels will begin to appear at the point of sale in the fall of 1978.

Figure 1 contains an illustration of the ENERGUIDE label. The essential ingredient of the label is information on the energy consumption (expressed in kilowatt hours per month) for the particular appliance model. the CSA is planning media promotions to support the introduction of this labeling scheme.

The objective of the ENERGUIDE labeling program is to inform consumers of the amount of energy an appliance uses before they buy. Labeling advocates feel that disclosures of energy consumption information to consumers at point of sale is a particularly effective means of precipitating more energy efficient choice behavior. Whether in fact the disclosure of electrical energy consumption (kwh) on ENERGUIDE labels will have the intended impact on choice behavior is, however, an unresolved issue. The research project outlined in the final section of this report is designed to provide evidence on ENERGUIDE label impact in actual retail settings.

The U.S. Energy Labeling Scheme for Appliances<sup>2</sup>. In the United States a Voluntary Labeling Program for Household Appliances and Equipment to Effect Energy Conservation was established as a result of a Presidential directive to the Department of Commerce, Council on Environmental Quality, and the Environmental Protection Agency in April, 1973. This program was established to deal exclusively with major energy consuming household appliances. The general purposes of the program were to:

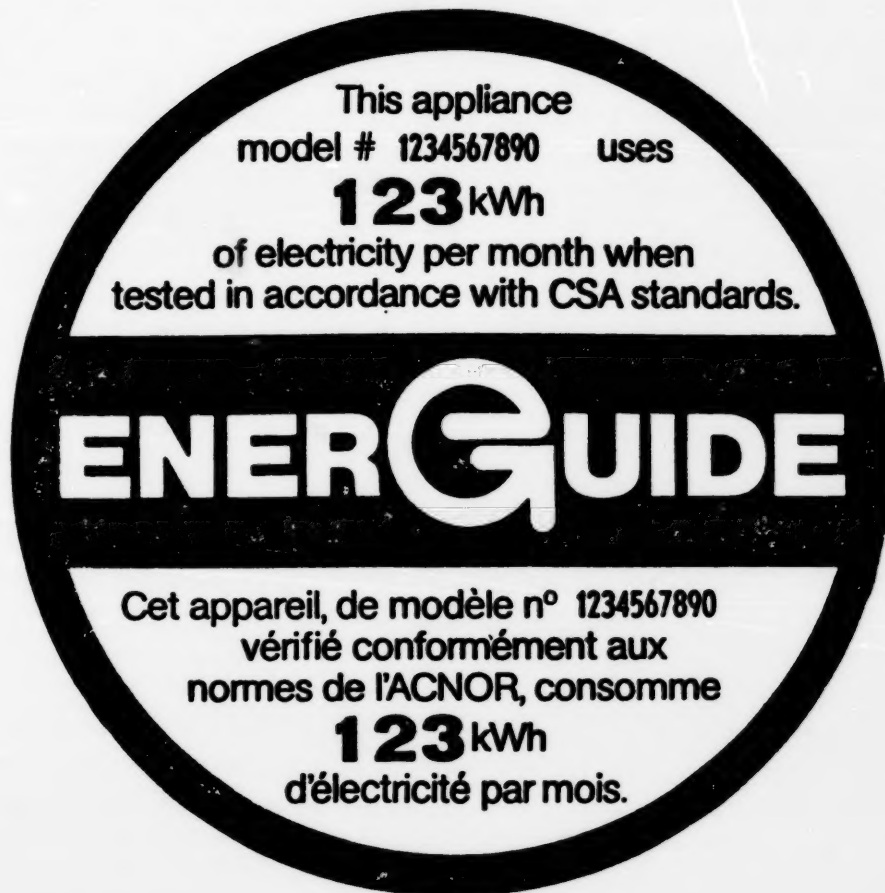
- (1) Encourage manufacturers (including private brand labelers) to voluntarily provide consumers with information concerning the energy efficiency or energy consumption of major durables.
- (2) Encourage consumers to utilize the information when evaluating products by presenting, at the point of sale, energy information in a uniform manner which is readily understandable in order to facilitate product comparisons.

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2 Much of this section is based on conversations and unpublished monographs provided by Dr. Bruce Hutton, Department of Energy, Washington, D.C.

FIGURE 1

Canada's ENERGUIDE Label for Appliances



Early success was achieved in that 24 manufacturers representing an estimated 95 percent of room air conditioner sales in U.S. were participating in the program as of 1975 and generally favourable consumer attitudes were exhibited toward such labels. Subsequently, in 1976, this voluntary program was abolished coinciding with the passage of the Energy Policy Conservation Act, which required a mandatory labeling program. The Federal Energy Agency (FEA) and Federal Trade Commission (FTC) now carry the primary responsibility in the labelling area under this act.

The Energy Policy and Conservation Act (EPCA) passed in December, 1975, has a broad range of powers, with major priorities in the areas of product testing, labeling, energy standards, and consumer education. EPCA labeling rules for covered products include disclosure of (1) the estimated annual operating costs and (2) information regarding the range of estimated annual operating costs. A sample EPCA label is shown in Figure 2. In addition, the FEA has the power to prescribe energy efficiency standards to any type or class of covered products. However, it is stipulated that resulting energy savings must out-weigh any increase in price or maintenance expense, lessening of product performance, or negative effects on competition in order to be implemented. Finally, the FEA will also carry out a program to educate consumers in areas of:

- (1) the significance of estimated operating costs,
- (2) ways in which comparative shopping can save energy for the nation and money for the individual consumer, and
- (3) other matters which may encourage conservation of energy.

It is interesting to contrast Canada's ENERGUIDE labels with the EPCA labels in the U.S. While both contain energy performance information, they differ in content and units of measurement used; ENERGUIDE labels use kwh/month while EPCA labels use energy cost/year together with information on the range of estimated annual operating costs for similar appliance models. In addition, the shape and layout of the labels differ. These differences may or may not affect consumer response. It is important to determine, for example, which content or format of presenting energy performance data (e.g., units vs. cost of consumption) will be most easily understood and utilized by consumers. Though further research is needed, a recent study found that dollar cost of consumption is more meaningful information to consumers than kwh units of energy consumed [14]. A third variation in label information content and form of presentation is discussed below.

Life Cycle Cost Information. One criticism of the ENERGUIDE and EPCA labels is that they do not establish a relationship between the purchase price of the product and its energy cost. Data on the latter attribute may have more influence if it is related to price. For the Canadian or U.S. energy labels described above, price-energy cost comparisons are hard, if

FIGURE 1

LIKELY CONTENTS OF THE U.S. (EPCA) APPLIANCE ENERGY LABEL

## How much does it cost to run your appliances?

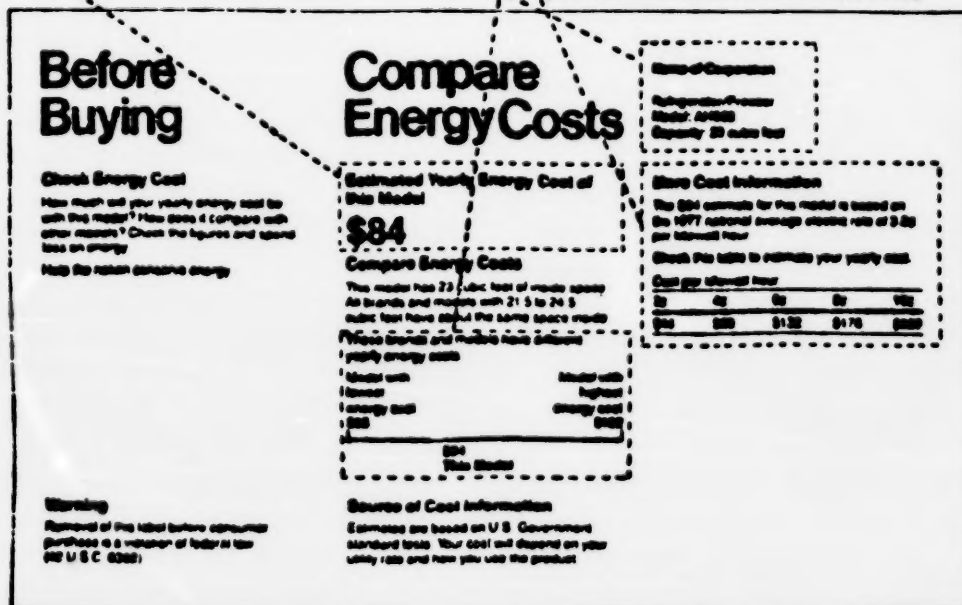
Everybody is energy-conscious. But so far there hasn't been a simple way for consumers to figure their household energy costs. Now, under a new law, the Federal Trade Commission staff is proposing that 13 categories of appliances be sold with labels giving consumers the estimated annual energy cost for an item — *before* they buy. Equally important, the labels would also give the range of estimated costs for comparable items.

If the FTC adopts the staff's recommendations, the next refrigerator you buy could carry a yellow and black label that looks like this example. It would give you:

### Appliances to be sold with Energy Labels

Refrigerators and refrigerator-freezers  
Freezers  
Dishwashers  
Clothes dryers  
Water heaters  
Room air conditioners  
Home heating equipment (other than furnaces)  
Televisions sets  
Kitchen ranges and ovens  
Clothes washers  
Humidifiers and dehumidifiers  
Central air conditioners  
Furnaces

- 1 A description of the model.
- 2 The estimated energy cost of the model.
- 3 The range of energy costs for comparable models.
- 4 Other useful information that will enable you to estimate costs even more precisely.



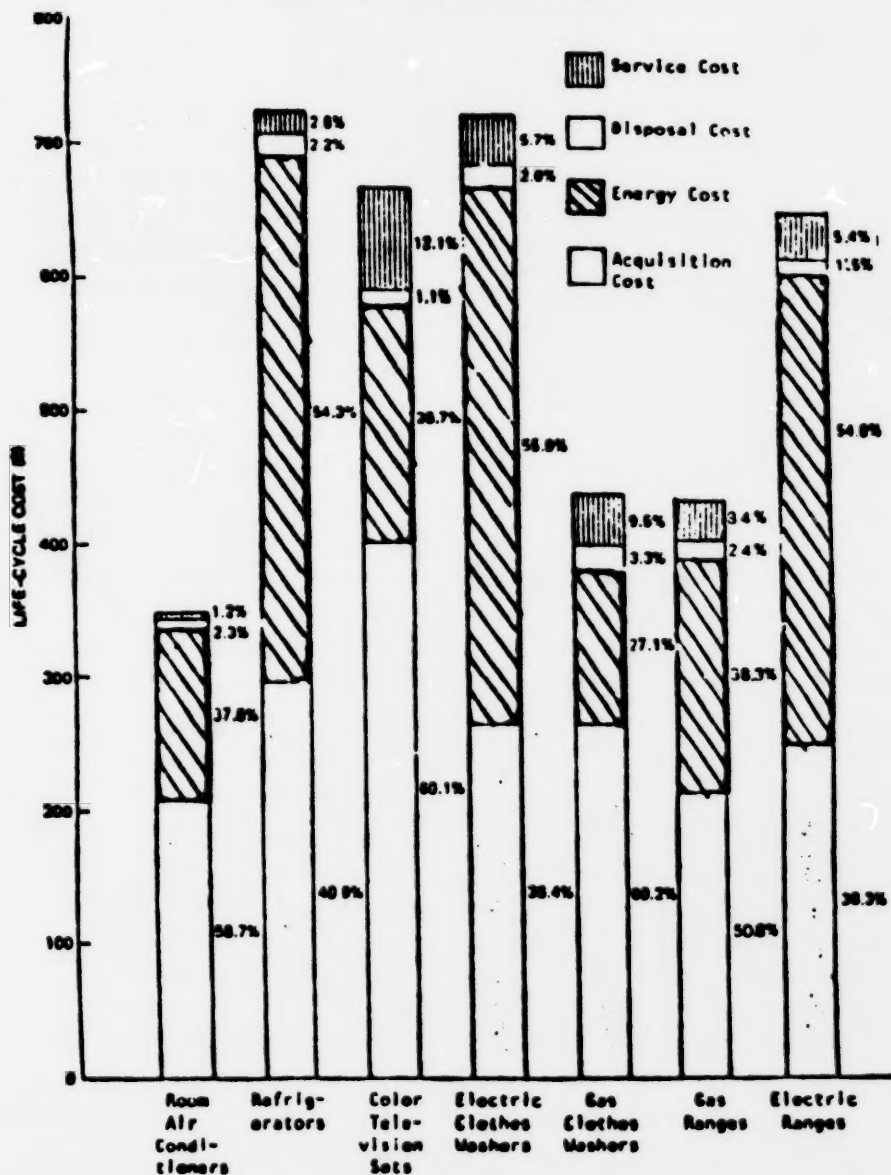
Source: Federal Trade Commission

not impossible, for the consumer to make. The consumer, if he wants to consider energy in his purchase decision, is faced with comparing purchase price to a kwh/month figure (ENERGUIDE label), or to a dollar energy cost/year figure (EPCA label). The result may be that the energy information is ignored. This possibility is less likely for the EPCA labels which express energy consumption in the same units as the price (dollars), although the time frames are not consistent.

Life cycle cost (LCC) information overcomes these disadvantages of the ENERGUIDE and EPCA labels. A product's life cycle cost is the sum of all dollars paid for it during its useful life including price, energy cost, maintenance/repair costs, and any disposal costs. As discussed by Hutton [11], this method of expressing cost provides the consumer with a comprehensive, organized and consistent way of dealing with product cost by incorporating the various cost dimensions within a consistent time frame (average product life) and with common units of measurement (dollars). Typically the LCC for a product is calculated using present value techniques; the power and service costs involved are discounted as future expenses, typically at a 10% discount rate. In addition, LCC can be expressed in constant dollars by deflating the future costs using the Consumer Price Index [15]. Table 5 illustrates life cycle costs for various appliances for the United States in 1974. As indicated, energy is the dominant LCC component for major appliances such as refrigerators, electrical clothes dryers and electric ranges. This suggests that purchasing those appliances on the basis of the lowest purchase price criteria may not be as economical to the consumer as a choice based on lowest LCC. A further implication is that manufacturers of high quality, energy efficient appliances may find that they have an edge on competition if LCC information is provided.

Proponents of life cycle costing, such as researchers at the Centre for Policy Alternatives at the Massachusetts Institute of Technology (MIT), claim that LCC concept has an "enormous potential as an instrument for improving consumer decision making" [16 p.2.] This information can be communicated to consumers at point of sale using the vehicle of LCC product labels. Difficulties arise, however, in coping with large variations in the non-price components of LCC. For example, energy (utility) and service costs (labour rates) vary considerably for different regions of the country. There are also a number of consumer-specific factors which cause variations in LCC—for example, usage rates, abuse rate, personal discount rate and expected duration of ownership (relevant product life).

Table 5  
APPLIANCE LIFE-CYCLE COSTS (1974)



Source: J.T. Prohaska, W.C. Briggs, J.B. DeWolf, and R.V. Lund, "Life-Cycle Costs Concepts, Considerations and Modeling," Volume IV, Ch. 2 of Consumer Durables: Warranties, Service Contracts and Alternatives, Center for Policy Alternatives, N.Y., forthcoming.

Because of these variations, the reserachers at MIT's Center for Policy Alternatives have designed and are proposing to test a system which provides consumers with individualized LCC information at the point of sale. These researchers feel such a system has the potential to "revolutionize the consumer decision process" [16 p.10.].

LCC data is obviously more complex than the information contained on the ENERGUIDE or EPCA labels. Unfortunately, there is little research to suggest which of the energy disclosures has the greatest impact on consumer decision making. It is reasonable to assume that point of sale label impact depends not only on the message content of the labels but on the extent of supportive information provided by other point of sale and mass media sources. In particular, as indicated earlier, salesperson messages may have a critical role to play in determining whether or not a point of sale energy labeling scheme is effective in altering consumer choice behavior.

#### AN ONGOING E.I.P.S. RESEARCH STUDY

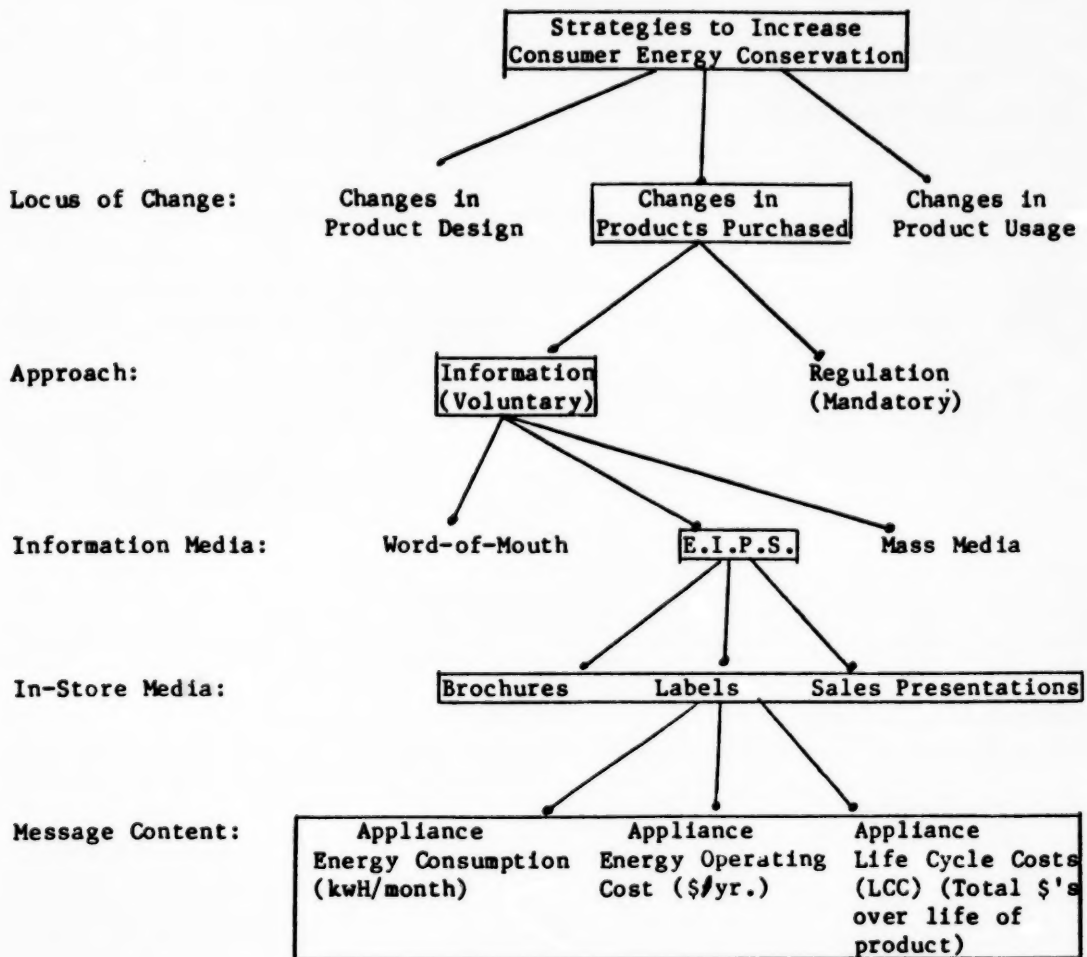
During the fall of 1978 a research study is being conducted to assess the impact of (1) alternative forms of energy information labels, and (2) alternative levels of retail sales force support for the energy conservation message on consumer appliance purchases. The study will take the form of a field experiment and will be conducted in the retail outlets of a major department store chain. This research is being sponsored by the Consumer Research Branch of the Federal Department of Consumer and Corporate Affairs, and is being conducted by researchers from the University of Manitoba and the University of British Columbia.

Figure 3 summarizes much of what has been discussed earlier in this paper, and helps to put the current study into perspective. In brief, EIPS is seen as one major method of achieving informed consumer purchase decisions. Further, energy-efficient purchase decisions are seen as providing major potential for long-run energy conservation.

Figure 3 also indicates the major variables of concern in the current EIPS research. First, the present study will attempt to assess the impact of alternative in-store media (brochures, labels, sales presentations). Second, message content alternatives (units of electrical energy consumption and dollar energy costs) will be considered.

FIGURE 3

ENERGY INFORMATION AT POINT OF SALE (E.I.P.S.)  
RESEARCH FRAMEWORK



\* Boxes indicate area of study.

### Research Design Overview

It must be emphasized that the research design presented here is still tentative. Discussions are still underway between the researchers, department store officials, and energy labeling experts. The objective of these discussions is to determine a design (1) that is feasible from the point of view of the retail setting, and (2) that will prove most useful in terms of providing guidance for labeling programs.

(i) Hypotheses: The research is centered on the following three general hypotheses:

- H1. The presence of energy information labels on refrigerators will lead consumers to select brands/models that are more energy-efficient.
- H2. Information on dollar cost of electricity to operate the appliance will have greater impact than information on kilowatt-hours of electricity consumed.
- H3. Energy labels supported by sales force presentations will have greater impact than labels alone.

The following discussion of experimental treatments, measurements and analyses will provide an indication as to how these hypotheses will be operationalized. However, a comment on the degree of impact expected may help to put the hypotheses into perspective.

The first hypothesis indicates that the presence of energy information labels is expected to shift consumers toward energy-efficient brands/models. However, the following would mitigate this effect:

- (1) the consumer may not notice the label,
- (2) the consumer may not understand the label,
- (3) the consumer may consider purchase price more important than operating costs, and/or
- (4) the store may not have available an energy-efficient model with the features the consumer is looking for.

In other words, the energy label is but one of many potential considerations facing the consumer at the time of purchase. Hence, a major shift to energy-efficient models is not expected. The second hypothesis, however, indicates that dollar energy cost messages are likely to be superior to ones containing units of energy consumption. That is, when the sales force pays no attention to the energy information,

dollar cost information is expected to be easier to understand (and hence have more impact) than kilowatt-hours consumed. However, when the sales force emphasizes and explains the energy labels little difference between dollars vs. kilowatt hours would be expected.

The third hypothesis concerns the situation of the greatest probability of energy-efficient consumer choice. As discussed earlier, salespersons appear to have a major impact on consumers' purchases of major durables. As a result it is likely that an effective explanation of energy consumption differences across models can have a very positive impact. The researchers expect that the presence of a strong sales force presentation will produce a significant shift toward more energy-efficient purchased decisions. On the other hand, if this presentation is not present, little change is expected.

(ii) Experimental Treatments. In addition to monitoring a set of stores as a "control", three experimental treatments are planned.

T.1 Energy Consumption (kwh units) Labels: all refrigerators in the stores with this treatment will have Canada's ENERGUIDE labels attached to the outside of the door at eye level. There will be no sales force attention to energy with this treatment.

T.2 Energy Cost Labels: similar to T1 except labels approximating the U.S. (EPCA) format will be used rather than ENERGUIDE labels.

T.3 ENERGUIDE labels plus sales force emphasis: In addition to the labels, the sales force will receive special training in methods of explaining the significance of the energy information.

During the experiment trained shoppers (researchers) will shop at the stores involved in the experiment to ensure that the treatments are being executed as planned.

(iii) Experimental Units. Approximately 12 stores from a major department store chain will be selected as the site for the experiment. These stores will be segmented into three groups that are matched in terms of store size, socio-economic area served, and geographic region. During a six-week period beginning early October, each store group will receive one of the experimental treatments.

(iv) Analysis: Since energy consumption by model and brand will be available at the outset of the research, the unit sales data will be readily converted to unit energy consumption (UEC) data. The following types of analyses will then be used.

$$SUEC_t = \frac{\sum UEC \text{ (for all units sold in period)}}{\text{number of units sold in period}}$$

. where  $SUEC_t$  is the store average UEC for period  $t$

$$SEPC_t = \frac{\sum UEC \text{ (for all units sold in period)}}{\text{total cubic feet of units sold in period}}$$

. where  $SEPC_t$  is the store average UEC per cu. ft. for period t

$$IEC = \frac{SUEC_{t_1}}{SUEC_{t_0}}$$

. where IEC is an index of the store unit energy consumption;  $t_1$  is the experimental period and  $t_0$  is the time period prior to the experiment

To assess the impact of these three treatments data from the stores within each treatment will be combined, and differences among these three groups evaluated.

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#### APPENDIX

Source: Wm. Michael Denney, "Energy - Relevant Messages in the Consumer Marketplace", Working paper CPA/WP-78-3 of the Center For Policy Alternatives, Massachusetts Institute of Technology, (January 27, 1978), pp. 22-24.

#### WHAT IS AN "ENERGY-RELEVANT" MESSAGE?

It is doubtful that a rigorous definition of "energy-relevance" can be formulated in the abstract, if only because the concept of "relevance" itself tends to evoke a sliding scale of subjective judgment. It will nevertheless be essential before going further in this paper to identify the major types of energy-relevant messages that could conceivably be provided in the consumer marketplace. Note that we are referring here to potential messages, setting aside for the moment the question of whether and to what degree such messages are actually being provided at the present time. Note, also, that the term "message" is used quite broadly here to cover virtually all manner of communications having a direct or indirect, explicit or implicit, factual or persuasive bearing on the subject of energy conservation.

What follows is a brief delineation of the main categories of energy-relevant messages. This list is intended to be comprehensive, although it may not be exhaustive in citing all conceivable examples. Some overlap among message categories may also be evident, for the aim here is to describe rather than provide a rigorous and mutually exclusive set of classifications.

- (1) Nature of the energy problem. This includes such basic information as trends in energy scarcity, U.S. dependence on oil exporting nations, prospects for additional or alternative energy supplies, and especially information about our national policy of energy conservation.

- (2) Energy prices. As with any economic resource, energy is of concern to consumers in large part because it must be paid for (sooner or later). Pricing information pertains not only to present day charges for gasoline, electricity, etc., but to probable future trends in energy costs. Pricing information overlaps with that about product/service energy usage, since individual energy expenditures (costs) are a fairly direct product of usage rates times price rates. It should also be emphasized that changes in energy pricing are as important as the absolute levels of prices.
- (3) Energy use characteristics of products. If consumers are to shift their purchases toward more energy-efficient products, they need information about how much energy various product alternatives use. This can be an extremely complex information area, ranging from raw data about wattage ratings and relative efficiency of appliances to more highly synthesized information about projected costs of operating a product. One might also include here certain kinds of background information about the type of energy a particular product uses (e.g., gas vs. electricity) and the relative desirability of using one energy type over another.
- (4) How to conserve the use of products and services. Whereas [3] above refers mainly to information relevant to product purchase decisions, there is a far broader amount of potential information that could be provided to foster efficiency in the way people use the products they already own. This information can range from "advice" to shut lights off when not needed, to more subtle or complicated guidance about proper ways to drive a car for good gasoline mileage or advice about the advantages of stove-top cooking.
- (5) Incentives and compensations for energy conservation. Aside from messages about why and how to conserve, consumers may also be provided with information about how to cope with conservation per se. There already exist or are being promulgated various incentives and compensations (tax deductions and credits, guaranteed loans, direct cash subsidies, etc.) to help citizens adjust to a less energy-intensive lifestyle. For such inducements to be effective, people must be made aware of them.
- (6) Alternatives to energy consumption. Even more fundamental to the challenge of coping with energy conservation is the need for guidance on non-energy consuming lifestyle alternatives. It is one thing to urge the purchase of more efficient products or to urge cutting back on the use of such products, and still another thing to convey to our citizenry what they may do instead. Car-pooling illustrates the former, whereas walking or bicycle riding represent significant energy-free alternatives.

- (7) How other individuals or groups are responding to the energy problem. To a considerable extent, people base their judgments and actions on cues derived from other individuals or groups in society. This suggests that consumers may be sensitive to what others are thinking and doing (or not doing) in support of energy conservation. We would include here messages about energy-relevant social norms, trends in energy use among salient reference groups, and perhaps even celebrity endorsements affecting the way consumers perceive and decide among energy use alternatives. It is also in this area that we encounter messages relating to the issue of social equity - - i.e., whether certain groups in society are carrying more than their fair burden in coping with public perceptions of blame or responsibility on the part of certain industries, government, and other institutions when it comes to dealing with the energy problem.
- (8) Encouragement to consume energy. There is a vast array of potential marketplace messages which may directly or indirectly encourage energy consumption. Although such overt messages as "Live electrically!" are unlikely to be found today, the very fact of promoting products or services which are relatively energy-intensive can itself be viewed as a source of energy-relevant messages to a car, a boat, an electric appliance, and so on are energy-relevant at least indirectly. Such messages help mold the American lifestyle around energy consumption, but they seldom tell the full story about the energy costs and other implications of the choices involved.